

TABLE 21 – WHEN, WHERE, AND HOW: AFV TECHNICAL TRAINING CNG, LPG, E85, EV

EV Training: The Hidden Infrastructure

The Twentieth Century will be remembered as the Century of the automobile or more precisely, the internal combustion engine (ICE) vehicle. In that time a knowledge base has developed due to three generations of automotive technicians learning about ICE vehicles, how they work and how to repair them, at their father's knee and then on to traditional training courses and then learning by doing as they ply their trade.

The transportation technology for the twenty-first century appears to be primarily electricity. The knowledge base for electric powered vehicles is in the same state of infancy as was the knowledge base for ICEs a century ago. Before a new technology can become sustainable in the market place, infrastructure to support it must be in place. In the case of EVs, infrastructure would include charging, knowledgeable emergency responders and a base of knowledgeable, skilled technicians to competently and safely maintain EVs to keep them on the road and on the job.

Mid-Del Center of Technology was requested to develop technical training for EVs by our local utility and several fleets either using EVs or planning to acquire them in the future. With the help of John Fagan and the Oklahoma University Electric Vehicle Research Institute, we developed our core curriculum for EV technology. With the help of our advisory committee, we have formed the Mid-Del EVCT (Electric Vehicle Center of Training and Technology). The EVCT has narrowed its focus to four course areas:

Electric Vehicles: Basic Technology

Modules 1&2- Background and history of EVs, discussion on approved alternative fuels, laws and mandates, comparison of EVs to internal combustion engine vehicles, an overview, of EV components.

Module 3- Safety, General shop safety, electrical safety rules, battery safety, collision and emergency response.

Modules 4-8- Basic Electricity, electronics, circuits, magnetism, inductance, semi-conductors, AC and DC

Module 9-Use of diagnostic meters, scopes, scanners, and PCs.

Modules 10&11- Batteries, electrochemical process, types of batteries, and the make up of a battery pack. Chargers; types, levels and charge profiles. Battery monitoring systems. Motors; types and uses. Controllers; their functions and relationships with other components.

Modules 12-14- EV maintenance, diagnostic and service procedures.

Module 15- Conversions, hybrids and the future of electric powered vehicles.

Electric Vehicles: Non Road

Covers safety, basic electricity and electronics, battery, motor and controller technology and how they are used in non road applications. Non road EVs are becoming more popular with the improvements in electronic controllers, advances in batteries and charger technology.

Electric Vehicle: Emergency Responder

As the use of electric vehicles increase, it is inevitable that they will be involved in accidents. It is a critical aspect of infrastructure to have a skilled and knowledgeable emergency response team to handle the special concerns associated with EVs.

Electric Vehicle: Public Awareness

This course is designed as a seminar to bring EVs and their operation to the public's attention. It gives an overview of how they work, differences in driving and operation, battery service and charging types and levels. The information is presented in non technical format to make information easy to understand.

In conclusion, we have learned from our training experience that:

Technicians can easily adapt to the new EV technology and can safely and competently maintain EVs.

The trickle down in technology from on road EVs to non road EVs has resulted in a better more sophisticated product that can be used in many more applications.

Emergency Responder training dispels many myths and misconceptions about EVs and gives the emergency response team the information necessary to safely respond to any accident involving EVs.